

AMENDMENTS TO THE SPECIFICATION

Please substitute the following paragraphs for the corresponding paragraphs of the specification.

Please replace the paragraph beginning on page 15 line 20 and ending on page 16, line 9 with the following amended paragraph:

In another embodiment the invention provides an isolated CpG oligonucleotide represented by at least the formula:



wherein at least one nucleotide separates consecutive CpGs; X₁X₂ are nucleotides selected from the group consisting of: GpT, GpG, GpA, ApA, ApT, ApG, CpT, CpA, CpG, TpA, TpT, and TpG; and X₃X₄ are nucleotides selected from the group consisting of: TpT, CpT, ApT, TpG, ApG, CpG, TpC, ApC, CpC, TpA, ApA, and CpA; N is any nucleotide and N₁ and N₂ are nucleic acid sequences composed of from about 0-25 N's each. Preferably X₁X₂ are GpA or GpT and X₃X₄ are TpT. In other preferred embodiments X₁ or X₂ or both are purines and X₃ or X₄ or both are pyrimidines or X₁X₂ are GpA and X₃ or X₄ or both are pyrimidines. In a preferred embodiment N₁ and N₂ of the nucleic acid do not contain a CCGG or CGCG quadmer or more than one CCG or CGG trimer. The effect of a CCGG or CGCG quadmer or more than one CCG or CGG trimer depends in part on the status of the oligonucleotide backbone. For instance, if the oligonucleotide has a phosphodiester backbone or a chimeric backbone the inclusion of these sequences in the oligonucleotide will only have minimal if any affect on the biological activity of the oligonucleotide. If the backbone is completely phosphorothioate or significantly phosphorothioate then the inclusion of these sequences may have more influence on the biological activity or the kinetics of the biological activity. In another preferred embodiment the CpG oligonucleotide has the sequence 5'TCN₁TX₁X₂CGX₃X₄3' (SEQ ID NO.: 99).